DOCUMENT RESUME

ED 059 971 SP 005 570

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TITLE Individual Differences and Preference for Instructional Methods.
INSTITUTION McGill Univ., Montreal (Quebec).
PUB DATE [71]
NOTE 22p.

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS *Discussion (Teaching Technique); *Educational Research; *Independent Study; *Lecture; *Student Characteristics

ABSTRACT

This study was part of an effort to evaluate the effectiveness of offering three options--lecture, lecture with discussions, and independent reading--to students in a large lecture course and was concerned with identifying any significant student variables related to choice of an option. The subjects were 185 students in an experimental psychology course on socialization. The instruments used include a test anxiety questionnaire, an omnibus personality inventory, and a general information questionnaire. Results indicated several significant differences between the three groups of students. Those who chose the independent study option indicate a significantly greater need for autonomy, flexibility, a higher tolerance for ambiguity, and a greater preference for abstract and scientific thinking than students who chose the lecture option. Students in the lecture-discussion group were significantly moderate in their preference for reflective thought and academic activities, not different from the lecture group in their interest in abstract thinking, and not different from the independent study group with respect to tolerance of ambiguity and autonomy. The lecture group scored significantly higher on the anti-intellectual authoritarian factor than the other two groups. Further research is under way to test for possible interactions between personality factors, the preference factor, and instructional methods and their effects on cognitive and affective outcomes. (MBM)

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INDIVIDUAL DIFFERENCES AND PREFERENCE FOR INSTRUCTIONAL METHODS

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by

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Offering different options to complete course goals is one way in which many instructors attempt to adapt their courses to student differences. The nature of these options is probably determined by the instructor's intuitive feeling that he is offering options which will collectively appeal to the greatest number of students; that is, that each option is considered to be satisfying to different types of students.

Some of the earlier research concerning student characteristics and instruction investigated the relationship between a motive or a trait and academic behavior. For instance, Atkinson and Litwin (1960) discovered that students who were high in need for achievement and low in test anxiety persisted longer and performed better on achievement tests than students who were low in achievement motivation and high in anxiety.

A few studies have reported that preference for particular instructional methods was related to certain personality characteristics. For example, Wispe (1951) found that students who are more independent prefer permissive teaching methods while insecure students prefer more directive methods. Koenig and McKeachie (1959) found that women high in need for achievement prefer independent study to lectures.

More recently, several researchers, heeding Cronbach's (1957) earlier advice, have been concerned with interactions

SP005570

[1]The author is grateful to Dr. Wilbert J. McKeachie, University of Michigan and Dr. Gale H. Roid, McGill University, for their helpful suggestions for this manuscript.

between student personality variables and instructor variables which affect student achievement. For instance, McKeachie (1961) found that students who were high in achievement motivation and low in anxiety received higher grades in classes in which instructors gave little feedback to students regarding the "correctness" of student behavior than students low in achievement motivation and high in anxiety. In another study, McKeachie (1966), found that male students who were high in need for affiliation made better grades in classes characterized by a "warm, friendly" atmosphere than students low in this motive.

The present study was part of a larger effort to evaluate the effectiveness of offering three options - lecture, lecture with discussions, and independent reading - to students in a large lecture course. The aspect reported here was concerned with identifying any significant student variables related to choice of an option. If matching students to appropriate methods is a viable procedure then development and refinement of these methods cannot proceed without additional knowledge of the most critical student characteristics and the ability to measure them.

PROCEDURES

Subjects

One hundred and eighty-five students representing over thirty different major areas of study elected the experimental course, "Socialization," a Psychology course at the University of Michigan. As Table 1 indicates there was no significant difference in choice of option with respect to sex. Although it is important to investigate sex differences, only forty-three of the students enrolled were males, and it was decided to eliminate this factor as a control variable for the remaining analyses.

TABLE 1

Option Choice & Sex

	Male	Female	
Ind. Study	18	42	60
Lecture	16	59	75
Lec-Disc.	9	41	50
	43	142	185

Method

Students were given the following descriptions of three instructional options and were asked to indicate their preferences for each:

1. Independent Study

Students in this method have an independent reading experience. Students are not expected to attend lectures and are not required to take examinations. The independent reading students are expected to do considerably more reading (8-10 hours weekly). Each student works out his own reading program with the instructor. This program is determined in part (about 50%) by the course syllabus and in part by the student's own particular choices. That is, the student is encouraged to explore readings in the library which are both relevant to the course and of interest to the student. Two written projects are required:

a. Reading log: Will include brief abstracts of the readings and more important will include student's personal comments, criticisms, applications, and evaluations of each reading. Students will

hand in the log twice during the semester for comments.

b. Term paper: A paper on any topic of the student's choice.

2. Lecture

Students in this method take the course strictly as a lecture course. Students are expected to attend lectures and read the required material on the course syllabus. They take a midterm and final exam and write a term paper on the topic of their choice.

3. Lecture and Discussion

Students in this method also take a midterm and final exam and write a term paper. But, in addition, these students also attend student-oriented discussion groups every other week. These student discussions will be based mainly on the case material. Therefore, students should plan to do the appropriate reading before each discussion session to insure productive discussions.

Instruments

A. Test Anxiety Questionnaire (Mandler and Sarason, 1952) An eleven item Likert-type scale was used to measure the students' admitted feelings about the testing situation.

B. Omnibus Personality Inventory (Heist and Yonge, 1968) Six of the fourteen scales of the OPI were of major concern for the present study and brief descriptions (extracted from the manual) of each of these scales will therefore be presented. For more complete data regarding reliability, validity, and development of the scales, the OPI Manual should be consulted.

1. Thinking Introversion

Persons scoring high on this measure are characterized by a liking for reflective thought and academic activities... Their thinking is less dominated by immediate conditions and situations, or by commonly accepted ideas than that of thinking extroverts (low scorers)... Low scorers like short factual questions in an examination better than those that require organization and interpretation...

2. Theoretical Orientation

High scorers indicate a preference for dealing with theoretical concerns and problems and for using the scientific method in thinking and enjoy doing assignments requiring original research work... Low scorers prefer having a theory explained to them rather than attempting to understand it on their own...

3. Complexity

This measure reflects an experimental and flexible orientation rather than a fixed way of viewing and organizing phenomena. High scorers are tolerant of ambiguities and uncertainties; they are fond of novel situations and ideas. Low scorers do not like things to be uncertain and find straightforward reasoning more appealing than the search for analogies...

4. Autonomy

The characteristic measured by this scale is composed of liberal, non-authoritarian thinking and a need for independence.

5. Practical Outlook

The high scorers on this scale are interested in practical applied activities... Low scorers find a greater appeal in ideas than in facts.

6. Social Extroversion

High scorers display a strong interest in being with people and they seek social activities and gain satisfaction from them. The social introvert tends to withdraw from social contacts and responsibilities.

C. General Information Questionnaire

This instrument contained a variety of questions soliciting demographic data and self-reports concerning a variety of student characteristics and habits.

HYPOTHESES, RATIONALES AND RESULTS

HYPOTHESIS A: Students who choose independent study as an option will have relatively more experience in the course's content area than students choosing the other two options.

Rationale: Students who are familiar with the general scope of the course, some or most of its content, are more likely to have specific personal goals with respect to the course and are more likely to desire the flexibility to pursue these interests. This hypothesis has no previous empirical support.

Results: This hypothesis must be rejected since no significant difference (Table 2) was found across options with respect to previous hours in psychology.

HYPOTHESIS B: Students preferring the independent study option will be doing relatively more concurrent course

work related to the content area of the experimental course than students choosing the other two options.

Rationale: The independent study option provides students who are taking other similar courses and who also value variety in their approach to learning (a type of flexibility) more opporunity to integrate the learning experiences of all the content-related courses.

Results: This hypothesis must be rejected since no significant differences were found with respect to "concurrent course work in psychology" (Table 2) across the three groups of option choosers. However, several students did report on the final course evaluation that the independent study option made it possible for them to integrate their work in the experimental course with another current academic experience. One student reported that "I was able to choose many of my readings for the course according to its relevance to my work with my tutee (disadvantaged child)."

- Insert Table 2 -

HYPOTHESIS C: Students who prefer the independent study option will indicate a relatively high need for flexibility, autonomy, and tolerance of ambiguity; students who choose the lecture-discussion option will indicate a moderate need for flexibility, autonomy, and tolerance of ambiguity; and students who choose the lecture option will indicate a relatively low need for flexibility (high need for structure), autonomy, and tolerance of ambiguity.

Rationale: The independent reading option offers students a greater chance to pursue their own particular interests, has much less defined requirements and expectations, and requires more self-directed behavior than the other two options. The lecture-discussion option offers a combination of structure (lecture) and flexbility (student-oriented discussions) and students who

prefer this option should favor the direction provided by the lecture but value at the same time the informality and ambiguity of student-run discussion groups. Haigh and Schmidt (1956) found that students who chose non-directive classes tended to be more flexible and to be better able to cope with ambiguity than students who chose more directive classes. Wispe (1951) found similar results in an earlier study.

Results: The results on both the Complexity (tolerance for ambiguity) and Autonomy scales of the OPI show that students preferring both the independent study option and the lecture-discussion options scored significantly higher than lecture-choosers; no significant differences between the former groups were found (Table 2). Therefore, it may be concluded that while independent study choosers are significantly higher than lecture choosers (on both scales), students choosing the lecture-discussion method are not significantly different from students choosing the independent study option on these measures; thus only the portion of the hypothesis which predicted the "moderate" position of the lecture-discussion choosers on these scales must be rejected.

There is some additional support for the prediction that independent study choosers would have a greater need for flexibility, reported in Table 4. Students choosing this option reported significantly more agreement with the item "enjoy completely flexible learning experiences" than lecture-discussion choosers and lecture choosers and significantly less agreement with the item "enjoy structure for learning experiences" than students preferring these other options.

HYPOTHESIS D: Students preferring the independent study option will indicate a relatively higher preference for abstract, theoretical, and scientific thinking than students choosing the other two options;

and students preferring the lecture and lecture-discussion options will indicate a relatively higher preference for factual and immediately applicable thinking than students who prefer the independent study option.

Rationale: Students who prefer the lecture are more likely to value factual and immediately apparent applications of content since the lecture's main characteristics is "transmission of knowledge;" whereas, students preferring to do independent reading should be more concerned with ideas than with facts since they are reading for their own comprehension rather than for the purpose of supplying answers for an exam.

Results: The results reported in Table 2 on Thinking Introversion (preference for reflective thought, less influenced by immediate conditions, etc.), Theoretical Orientation (preference for abstract and scientific thinking), and Practical Outlook (preference for factual, applicable information, less concern with ideas) indicate that students who prefer independent study are significantly different from lecture-choosers on all three of these scales and in the predicted direction in each case. Lecture-discussion choosers varied in their relative position to the other two groups depending on the scale: they were significantly moderate (less than independent study choosers, greater than lecture choosers) on the Thinking Introversion scale; no different from the lecture choosers with respect to Theoretical Orientation; and no different from the independent study choosers with respect to Practical Outlook. Once again, the portion of the hypothesis, which stated that the independent study choosers would be significantly greater on all three scales than the lecture-discussion choosers must be rejected.

HYPOTHESIS E: Students who choose independent study as an option are more likely to have previous experience

with this mode of learning than students who choose the other two options.

Rationale: Since independent study is not a required mode of learning for any student in the Michigan curriculum, but rather an elected mode, students who choose the present option of independent study are more likely to have had a previous experience with this method of learning. Although the literature has no evidence bearing directly on this hypothesis, Haigh and Schmidt (1956) found that students preferring nondirective classes were more likely to have had experience in nondirective classes.

Results: The data reported in Table 3 supports this hypothesis indicating that students who preferred this option were more likely to have had a previous experience with independent study.

- Insert Table 3 -

HYPOTHESIS F: Students who prefer the independent reading option are in the habit of doing more independent and self-directed (non-required) reading than students choosing the other options.

Rationale: Students who choose independent study are required to do considerably more reading than students in the other options and preference for this option should be, in part, determined by their reading ability and habits.

- Insert Table 4 -

Results: Table 5 indicates that independent reading students reported that they are in the habit of doing more "extra-curricular" reading than students who prefer the other two options. In addition, in response to the item "slow reader"

(Table 4), students who chose the independent study option indicated that this item was significantly less characteristic of them than students who chose the other options. Thus, the evidence presented in the present study supports this hypothesis.

- Insert Table 5 -

HYPOTHESIS G: Students preferring the independent study option will have a relatively higher test anxiety than students choosing the other options.

Rationale: Students who choose independent study may have done so for avoidance reasons as well as approach reasons; since independent study does not require the students to take exams, some students may prefer this option to avoid test taking situations.

Results: No significant differences were found across option choosers with respect to scores on the Test Anxiety Questionnaire, as reported in Table 2. Further, in response to the item "very anxious about tests", no significant differences were found with respect to option choosers' agreement with the item. Therefore, this hypothesis must be rejected.

HYPOTHESIS H: Students preferring the lecture-discussion option will be characterized by a relatively greater interest in interacting with people than students preferring the other two options.

Rationale: Students electing this option should view the student-discussions as more valuable and thus place more value on interacting with their peers than students who choose the other options.

Results: Students preferring the lecture-discussion option reported that they spend significantly more "time in informal serious discussions" with their peers than students choosing the

other two options (Table 6). Also, in response to the item 'enjoy 'bull sessions'", lecture-discussion choosers reported that this item was significantly more characteristic of them than did the other option choosers. Finally, results on the Social Extroversion scale (Table 2), although not significant, show that the group means are in the predicted direction. Therefore, there is some evidence supporting the hypothesis that students preferring the lecture-discussion option "indicate a relatively greater interest in interacting with people".

- Insert Table 6 -

DISCUSSION

Additional Data and Comments

It had been predicted that independent study choosers would have had more previous experience in the course's area (Hypothesis A). It is possible that this hypothesis would be more validly tested if the experimental course were chosen by students electing the course for a greater range of academic reasons. That is, since most students were not majoring in Psychology, perhaps because the experimental course does not provide credit toward major requirements, the present course may have had a selection bias favoring students with less experience (overall mean of previous hours in Psychology was 8.34 or about 2 previous courses). We feel that this hypothesis deserves further testing in an instructional setting for which there is reason to believe, exists a greater range of students experience related to the course than was found in the present experimental population.

In addition, part of the rationale supporting Hypothesis A was based on the fact that students who have had more experience in the course area "are more likely to have specific personal

goals" for the course. The hypothesis was rejected since there was no difference with respect to "previous experience in psychology". But 47% of students choosing independent study said that the main reason for this choice was that this option gave them the "opportunity to explore personal, academic and educational goals". It may be, therefore, that having specific and numerous personal goals with respect to a particular course are not necessarily dependent upon having had much experience in its content area. This possibility should also be explored.

Additional results also revealed that 18% of those students choosing the lecture option said that the main reason for choosing this method was that it "provided necessary structure" and another 18% listed "less reading to do" as the main reason for preferring this option and/or had less reading to do". This lends some support to the hypotheses dealing with lecture choosers' need for structure and lesser reading habits and ability.

Also, of all the students who chose the lecture-discussion option, 92% of them stated that this option gave them the "opportunity to interact with their peers and the instructors, providing additional support to the hypothesis dealing with these students and their interest in interacting with people.

Finally, one additional finding should be mentioned. The independent reading choosers reported significantly greater agreement with the item "like to write papers" (Table 4) than those students who preferred the other two options. This finding together with the fact most of the activity of the independent reading students consists of writing reaction reports for their reading log suggests that writing ability as well as reading habits may be an important variable related to choosing this option.

Anti-Intellectual Authoritarianism Factor

The results reported to test hypotheses C and D indicate

that on all five of the OPI scales independent study choosers and lecture choosers are significantly different and in the predicted direction in each case. On one of the scales (Thinking Introversion) the lecture-discussion choosers were significantly moderate, on three of the scales (Complexity, Autonomy, and Practical Outlook) these students were not different from the independent study choosers and on one scale (Theoretical Orientation) they were no different from students who preferred the lecture.

The OPI manual reports factor analyses on a normative sample of over seven thousand students. The results of this analysis indicates that the five scales in question, together with the Religious Orientation scale, load on a factor which they have labeled "Anti-Intellectual Authoritarianism". The loadings are as follows: Practical Outlook: .93; Autonomy: -.88; Complexity: -.61; Thinking Introversion: -.56; Religious Orientation: -.41; and Theoretical Orientation: -.40. As the manual points out, "high scores on a scale composed of items in this factor would be pragmatic and utilitarian in their orientation to work and ideas; they would...generally prefer unambiguous situations where everything has a definite place... Their rejection of an interest in scholarly activities and scientific-theoretical endeavors would also point to a lack of concern" for the untried ideas and concepts (Heist and Yonge, p. 52).

The subjects were therefore scored on this factor. The results revealed a significant ($p < .01$) overall F ratio ($F = 5.52$, df 2, 177). A posterior analysis (Newman-Keuls) yielded a significantly higher score for lecture-choosers on the anti-intellectual authoritarian factor than choosers of the other two options. No significant differences were found between these latter groups.

Summary of Results

The results of this study reveal several significant

differences between students preferring each of the experimental instructional options. Students who choose the independent study option indicate a significantly greater need for autonomy, flexibility, a higher tolerance for ambiguity, and a greater preference for abstract and scientific thinking than students who prefer the lecture option. Students preferring the lecture-discussion option are significantly moderate (less than independent choosers, greater than lecture choosers) in their preference for reflective thought and academic activities (Thinking Introversion), no different from the lecture choosers in indicating a significantly lesser interest in abstract thinking than independent study choosers, and no different from independent study choosers with respect to tolerance of ambiguity (Complexity) and Autonomy. Lecture choosers scored significantly higher on the anti-intellectual authoritarian factor than choosers of the other two options.

Furthermore, students preferring the independent study option are more likely to have had a previous experience with this mode of learning, indicate that they do more non-required reading and indicate more enjoyment in writing papers than students who prefer the other options.

We have also found that students favoring the lecture-discussion method indicate that they enjoy "bull sessions" and have more frequent informal discussions with their peers than choosers of the other options.

Conclusion

Any instructors who offer various options to students for completing the course's requirements must base their use of this technique on their desire to "adapt to the individual differences" of the students. The present study certainly lends support to the fact that, at least with respect to the options offered in the present course, options do appeal to different

types of students with different habits, abilities and experience. Additional research should be conducted to discover whether or not these differences interact significantly with the various methods to produce effects on course outcomes. Another study (Pascal and McKeachie, 1970) has shown that students are in favor of options but that effects of receiving one's preferred option are not as dramatic as predicted. Both of these studies suggest that a three way analysis of variance design be used to test for possible interactions between personality factors, the preference factor (receiving or not receiving preferred option) and instructional methods and their effects on cognitive and affective outcomes. This line of research is currently being pursued.

TABLE 2

OPTION CHOICE AND PERSONALITY AND ACADEMIC VARIABLES
(One-way analysis of variance)

	Variable	Means: Ind.Study	Lec.	Lec-Disc.	D.F.	M.S.	F	Significance
	Grade point Ave.	2.96	2.83	2.86	2	0.33	2.15	ns
					Error: 175	0.15		
	Previous hours in Psychology	8.60	8.16	8.28	2	3.33	0.13	ns
					Error: 182	25.54		
	Concurrent hours in Psychology	2.26	1.80	2.76	2	13.96	1.77	ns
					Error: 182	7.87		
O	Test Anxiety	31.03	32.59	33.33	2	77.71	1.26	ns
P					Error: 179	61.59		
I	Thinking Introversion	53.03	47.85	50.88	2	448.00	6.79	.01
					Error: 179	65.99		
S	Theoretical Orientation	50.00	45.26	45.56	2	426.84	5.58	.01
C					Error: 179	76.49		
A	Complexity	56.73	50.97	55.36	2	600.56	5.31	.01
L					Error: 179	113.15		
E	Autonomy	61.97	59.00	61.98	2	193.53	3.69	.05
S					Error: 179	52.49		
	Social Extroversion	48.88	48.14	50.54	2	87.02	0.83	ns
					Error: 179	104.27		
	Practical Outlook	41.61	45.64	42.96	2	279.75	4.29	.05
					Error: 179	65.27		

TABLE 3

OPTION CHOICE AND PREVIOUS EXPERIENCE WITH INDEPENDENT STUDY

	No	Yes	
Ind. Study	44	14	58
Lecture	66	6	72
Lec-Disc.	44	5	49
	154	25	179

$x^2_{(2)} = 7.47$ ($p < .05$)

TABLE 4

OPTION CHOICE AND AGREEMENT WITH SEVERAL ITEMS
(One-way analysis of variance)

Key: 1 = very characteristic of me... 6 = very uncharacteristic

Item	Means: Ind.Study	Lec.	Lec-Disc.	D.F.	M.S.	F	Significance
Dislike lecture	3.10	3.72	3.45	2	6.31	4.40	.05
			Error:	177	1.43		
Enjoy "Bull Sessions"	2.03	2.21	1.56	2	6.06	5.04	.01
			Error:	178	1.20		
Slow reader	3.12	2.71	2.30	2	8.63	4.50	.05
			Error:	178	1.92		
Enjoy structure for learning experiences	3.16	2.48	2.50	2	8.65	6.33	.01
			Error:	177	1.37		
Enjoy completely flexible learning experiences	2.10	2.83	2.54	2	8.67	7.26	.01
			Error:	177	1.19		
Like to write papers	2.87	3.76	3.30	2	12.89	7.94	.01
			Error:	176	1.62		

TABLE 5

EXTRACURRICULAR READING HABITS
AND OPTION CHOICE
(One-way analysis of variance)

Source of Variation	D.F.	M.S.	F	Signif.
Option Choice	2	1.49	3.14	.05
Error (within cells)	177	0.47		

Means:

Ind. Study	Lecture	Lec-Disc.
1.71*	1.40	1.54

* Scoring key: 1 = less than one book/month
3 = three or more books/month

TABLE 6

TIME SPENT IN INFORMAL DISCUSSIONS
AND OPTION CHOICE
(One-way analysis of variance)

Source of Variation	D.F.	M.S.	F	Signif.
Option Choice	2	3.71	3.85	.05
Error (within cells)	177	0.96		

Means:

Ind. Study	Lecture	Lec-Disc.
2.76*	2.62	3.12

* Scoring key: 1 = less than one hr./week
4 = five or more hrs./week

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